



WESTERN FIRE CENTER, INC.

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Underside Deck Testing of Iron Woods™ Brand Ipe Hardwood Material

Indicative testing conducted in accordance with the test methodology described in CSFM 12-7A-4, Materials and Construction Materials for Exterior Wildfire Exposure: Decking

Product:

**$\frac{3}{4}$ " (minimum) \times $5\frac{1}{2}$ " (minimum) Iron Woods™ Brand Ipe Hardwood
 $\frac{3}{16}$ " (maximum) Edge-to-Edge Spacing**

Conducted For:

**Timber Holdings USA – Iron Woods
2960 N. 112th St.
Wauwatosa, WI 53222**

WFCi Report #12158r1

Test Date: January 16&18, 2013

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INTRODUCTION

This report documents the successful fire testing of Iron Woods™ brand ipe hardwood deck board from Timber Holdings USA – Iron Woods in accordance with the requirements defined in the 2010 California Building Code, Chapter 7A (CSFM 12-7A-4), *Materials and Construction Methods for Exterior Wildfire Exposure – Decking*. This testing series included under deck tests (Part A) and burning brand tests (Part B). The burning brand tests are also applicable for San Diego County Building Code, Section 709A.1.4.

SUMMARY OF TEST METHOD

Under Deck – Part A

Under deck testing was performed using a 12" × 12" diffusion sand burner providing 80 ± 4 kW for a period of 3 min applied to the underside of a decking test assembly. A 40 min observation period was allowed following burner application to the assembly. The sample holder and burner specifications are included in Figure 1 as well as CSFM 12-7A-4, *Materials and Construction Methods for Exterior Wildfire Exposure – Decking*. The entire assembly was placed under WFCi's hood calorimeter which measured heat release during the test period. Three consecutive tests must pass for approval.

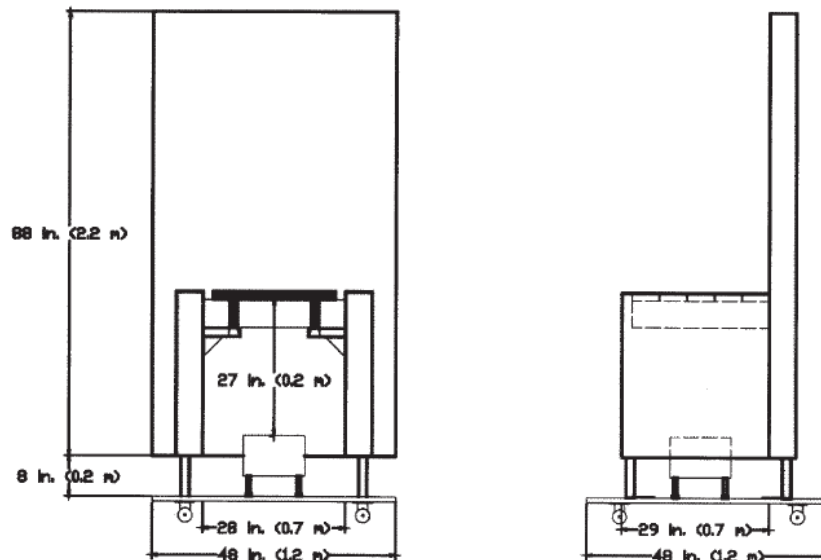


Figure 1. Sample holder and burner for underdeck test.

Conditions of acceptance for the CSFM 12-7A-4 under deck are as follows:

12-7A-4.7.5 **Conditions of acceptance.** Should one of the three replicates fail to meet the Condition of Acceptance, three additional tests may be run. All the additional tests must meet the Condition of Acceptance.

1. Effective net peak heat release rate of less than or equal to 25 kW/ft^2 (269 kW/m^2).
2. Absence of sustained flaming or glowing combustion of any kind at the conclusion of the 40-minute observation period.
3. Absence of falling particles that are still burning when reaching the burner or floor.

Burning Brand – Part B

Burning brand testing was performed using a wind tunnel used in ASTM E108, *Test Methods for Fire Tests and Roof Coverings*, with a wind speed of 12 mph. The sample deck was placed 60” from the opening of the wind tunnel (Figure 2). According to the San Diego County code, a Class B brand was ignited according to ASTM E108, then placed on the sample deck 2½” from the leading edge of the deck. Observations were recorded for a 40-min period.

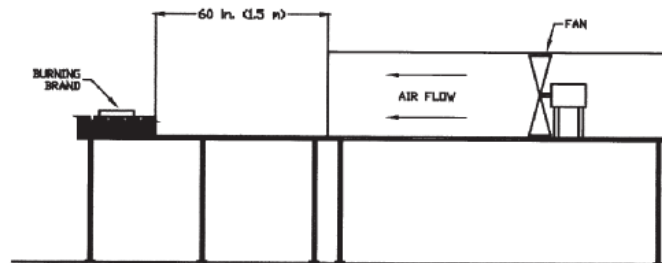


Figure 2. Burning brand deck assembly using E108 apparatus.

Conditions of acceptance for the CSFM 12-7A-4 burning brand are as follows:

12-7A-4.8.5 **Conditions of acceptance.** Should one of the three replicates fail to meet the Condition of Acceptance, three additional tests may be run. All the additional tests must meet the Condition of Acceptance.

1. Absence of sustained flaming or glowing combustion of any kind at the conclusion of the 40-minute observation period.
2. Absence of falling particles that are still burning when reaching the burner or floor.

SAMPLE DESCRIPTION

The ipe hardwood material was received by WFCi on December 17, 2012 and January 3, 2013 as 2’ planks. WFCi did not verify the manufacturing techniques or accuracy of the products and labeling. No third-party sampling was performed or verified for this product. Each plank was ¾” × 5½” × 24” (square-edge). Five boards were positioned on two nominally 2×6 Douglas fir joists, 28¼” long with 16” center-to-center spacing. The edge-to-edge spacing of the planks was maintained at 3/16”, resulting in a top deck surface area of 4.7 ft². The test planks were attached to the joists with deck screws. The moisture content of the planks and joists were approximately 11% at the time of testing, as measured by oven-drying.



Figure 3. Representative test assembly for under deck tests.

TEST RESULTS

Under Deck Tests – Part A

Under deck testing of the assemblies took place on January 16, 2013. The energy from the burner was verified before testing took place to be 78.3 ± 1.5 kW. All three assemblies displayed heat release below the criterion of 25 kW/ft^2 as can be seen in Table 1 and Figure 4, no continued combustion (flaming, glowing, or smoking) after the 40 minute observation period, and no particles that continued to burn once hitting the floor or burner. Photographs are also included in Figure 5 - Figure 7.

A typical test exhibited flaming within the deck gaps within 1-2 minutes during burning application. Once the burner was turned off, flames continued in the gaps for approximately 1 minute. Glowing continued for another 3-5 minutes, while smoking continued for 10-15 minutes following the burner being turned off, after which the test was terminated.

Table 1. Summary of heat release rate results for underdeck tests.

Test Parameter	Test 1	Test 2	Test 3
Peak Heat Release Rate (kW)	151	159	186
Effective Peak Heat Release Rate [HRR - 80 kW]/Area (kW/ft^2)	15.3	16.7	22.6
Time of Peak Heat Release (s)	131	154	139
Results – According to CSFM 12-7A-4	Pass	Pass	Pass

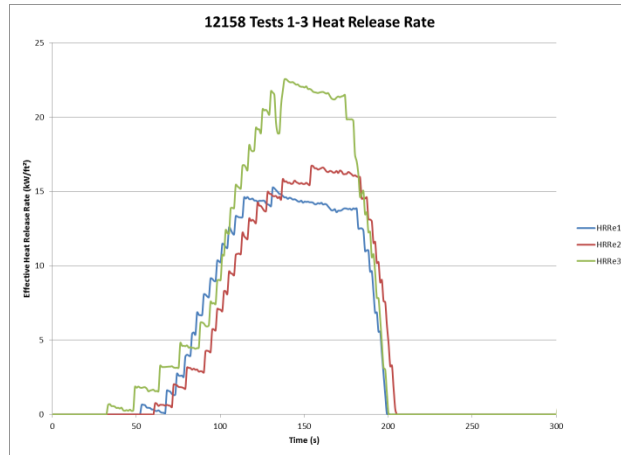


Figure 4. Effective net heat release rate for under deck tests.



Figure 5. Sequential photographs from Test 1.



Figure 6. Sequential photographs from Test 2.



Figure 7. Sequential photographs from Test 3.

Burning Brand Tests – Part B

Burning brand testing of the assemblies took place on January 18, 2013. The wind speed was verified before testing took place to be 5.28 ± 0.8 m/s. All three boards maintained structural stability and did not continue to burn (flaming, glowing, or smoking) after the 40 minute observation period and no particles continued to burn once hitting the floor. Photographs are also included in Figure 8 - Figure 10.

A typical test exhibited flaming within the deck gaps within 1-3 minutes after brand application. The brand continued to burn for approximately 10-15 minutes on top of the deck assembly. Glowing typically continued in the gaps for another 10-15 minutes, until it was self-extinguished. Once combustion ceased, the test was terminated.



Figure 8. Sequential photographs from Test 4.



Figure 9. Sequential photographs from Test 5.



Figure 10. Sequential photographs from Test 6.

SUMMARY

This Iron Woods™ brand ipe hardwood deck board described in this report with dimensions of $\frac{3}{4}'' \times 5\frac{1}{2}''$ is deemed to meet the requirements of CSFM 12-7A-4, *Materials and Construction Methods for Exterior Wildfire Exposure – Decking*, as well as those proscribed in the San Diego County Code, Section 709A.1.4. The test results apply to deck planks with to edge-to-edge gap spacing of a maximum of $\frac{3}{16}''$, a minimum thickness of $\frac{3}{4}''$, and a minimum width of $5\frac{1}{2}''$.

SIGNATURES

Testing performed by,



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Laboratory Manager

Reviewed and Approved by,



Brent M. Pickett, Ph.D.

Technical Director

WESTERN FIRE CENTER AUTHORIZES THE CLIENT NAMED HEREIN TO REPRODUCE THIS REPORT ONLY IF REPRODUCED IN ITS ENTIRETY

The test specimen identification is as provided by the client and WFCi accepts no responsibilities for any inaccuracies therein. WFCi has not verified the composition, manufacturing techniques or quality assurance procedures.

Version	Date Issued	Document Number	Changes
Original	January 21, 2013	12158	Original report
Revision 1	May 1, 2013	12158r1	This product was tested at minimum dimensions and maximum edge-to-edge spacing. Any board larger or smaller spacing should be acceptable. Altered wording to indicate as much.